### [4]

- b) Mention the forces accounting the thermodynamic stability during the protein folding phenomenon. What is the role of PDI in the folding mechanism?  $1\frac{1}{2}+1$
- c) Mention the application of the following reagents in protein chemistry (*any two*):  $1\frac{1}{2}x2$ 
  - i) Cyanogen bromide
  - ii) Phenyl isothiocyanate
  - iii) Ellman's reagent (DTNB)
- d) Give the outline of the method for the determination of amino acid composition of a protein.

#### Ex/M.Sc/CH/4/O-4151/107/2017

# M. Sc. Chemistry Examination, 2017

(4th Semester)

# ORGANIC CHEMISTRY SPECIAL PAPER - XV-O

Time: Two hours

Full Marks: 50

(25 marks for each unit)

Use a separate answerscript for each unit.

### **UNIT - O - 4151**

- a) A linear homopolysaccharide consisting of a hexose and having low negative specific rotation on periodate oxidation consumes I equir of periodate per repeating unit and on subsequent Smith degradation produces glycol aldehyde and 2<u>L</u>, 3<u>D</u>-butane-1, 2, 3-triol. Deduce the structure of the polysaccharide with justification.
  - b) What is meant by 'response factor' in G.L.C. analysis? Among the mass fragments in the E.I.M.S. of 1, 5-di-O-acetyl-2, 3, 4, 6-tetra-O-methyl-D-glucitol explain the peaks at m/e 161, 129 and 87.
  - c) Write the structures of the partially methylated monosaccharides obtained on methylation analysis of the polysaccharide:

$$\frac{1}{2}3 - \beta - D - Galp - (1 \rightarrow 6) - \alpha - D - Galf - (1 \rightarrow 3) - \beta - D - Galp - (1) \xrightarrow{\uparrow_1^3} \alpha - D - Glep$$

[ Turn over

## 2. a) Answer (i) or (ii):

 Synthesise the following disaccharide glycoside starting with the corresponding native monosaccharides.

$$\beta - D - Galp - (1 \rightarrow 3) - \beta - D - Galp - (1 \rightarrow OPh)$$
 5

ii) Starting with the native sugar and utilizing 'Two stage glycosylation technique' synthesise:

$$\beta - D - Glcp - (1 \rightarrow 4) - \beta - D - Glcp - (1 \rightarrow OPh)$$

- b) What is meant by 'Armed-Disarmed' donors? Explain with suitable examples and the corresponding glycosylation reaction. (synthesis of 'armed' and 'disarmed' donors is not necessary).  $2\frac{1}{2}$
- c) How can D-glucose be converted to its corresponding 2deoxy sugar?  $1\frac{1}{2}$
- 3. Carry out the following transformations:

a) 
$$L - Rha \longrightarrow L - Daunosamine$$
 5

b) i) 
$$D-Gal \longrightarrow BnO \longrightarrow SPh$$
 2

ii) Write the IUPAC nomenclature of the product obtained from D-Gal in the above transformation. 1

### **UNIT - O - 4152**

4. a) How are  $\beta$ -bend structures formed in protein ? What is ' $\beta \alpha \beta$ ' motif ? Mention its biological importance.

 $1 + \frac{1}{2} + 1$ 

- b) How are helics formed? Discuss the major differences between an  $\alpha$ -helix and a  $\pi$ -helix.  $\frac{1}{2}+2$
- c) Describe a method for the determination of the positionof S-S-(disulfide) bonds in a protein.
- 5. a) 2-Bromoethylamine reacts with cysteine side chains in a protein to form S-aminoethyl derivatives. The peptide bond on carboxyl site of the modified cysteine residues becomes succeptible to hydrolysis by trypsin Why?

 $1\frac{1}{2}$ 

b) What is collagen? Discuss its structural features. Mention the role of vitamin C in the stabilization of collagen fibre?

 $\frac{1}{2}$  + 2 + 1

- c) What is MRE ? Why is near UV-CD spectrum very important to detect the correctly folded structure of a protein?  $1+1\frac{1}{2}$
- 6. a) What is Ramachandran diagram? Show the regions of allowed conformations of poly-L-alanine in this diagram.

1+2

[ Turn over